

High Temperature "Smart" P3 Sensors and Electronics for Distributed Engine Control, Phase II

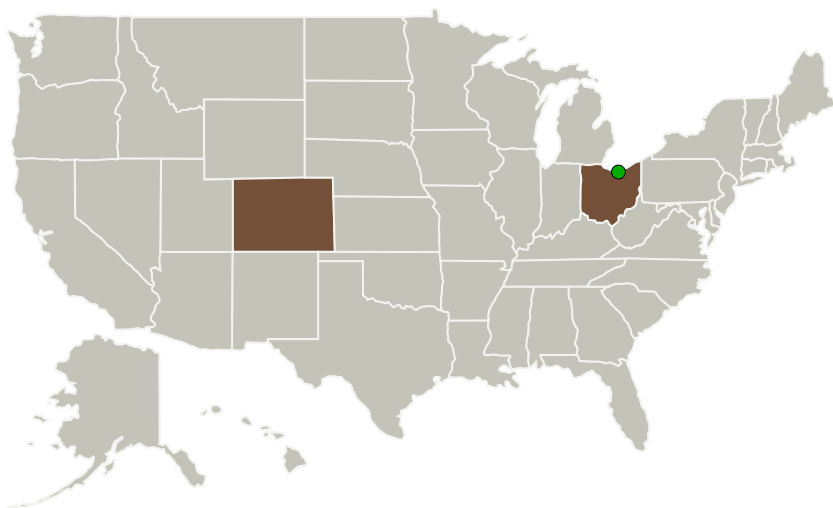
Completed Technology Project (2016 - 2019)



Project Introduction

Current engine control architectures impose limitations on the insertion of new control capabilities due to weight penalties and reliability issues related to complex wiring harnesses. NASA in collaboration with Air Force Research Lab (AFRL) has been conducting research in developing technologies to enable Distributed Engine Control (DEC) architectures. Realization of such future intelligent engines depends on the development of both hardware and software, including high temperature electronics and sensors to make smart components. NASA is particularly interested in the design and development of these applications for assessing the benefit they bring to the engine system. Compressor discharge pressure measurement has long been a key aspect of turbine engine control to manage stall margin. Given that, there is a need for a high-temperature, smart P3 sensor as a key building block for distributed engine controls. Given the current limitations of high temperature electronics, the business case for smart control elements (sensors and actuators) can be made in the fan/compressor section of the engine. The long-term objective of the proposed effort is to advance high-temperature P3 sensor technology for DEC applications through working with OEM partners and industry working groups to: (1) to iterate the current technology toward DEC formats/functions, (2) advance the digital electronics design/firmware and high temperature electronics, and (3) (through demonstration and stakeholder collaboration) present the viability (technical and business case) of the proposed sensor.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sporian Microsystems, Inc.	Lead Organization	Industry	Lafayette, Colorado
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Colorado	Ohio

Project Transitions

▶ **April 2016:** Project Start

✓ **April 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139837>)

Images

**Briefing Chart Image**

High Temperature "Smart" P3 Sensors and Electronics for Distributed Engine Control, Phase II (<https://techport.nasa.gov/image/135290>)

**Final Summary Chart Image**

High Temperature "Smart" P3 Sensors and Electronics for Distributed Engine Control, Phase II (<https://techport.nasa.gov/image/130301>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sporian Microsystems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

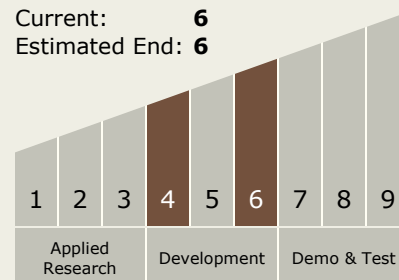
Carlos Torrez

Principal Investigator:

Alex Brand

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.4 Pressure Gain Combustion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System